

REMARKS

Claims 1 and 3-13 are pending in the application.

To date, no Notice of Draftsperson's Patent Drawing Review has been received. Applicants respectfully request receipt of this document when it becomes available. Please note that the original drawings filed in the patent application are "formal" drawings.

35 U.S.C. § 102(b) Rejection

Claims 1, 3, and 7-11 are rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,601,352 to Okamura ("Okamura"). Because Okamura fails to disclose all of the limitations of claims 1, 3, and 7-11, it is respectfully maintained that claims 1, 3, and 7-11 patentably distinguish Okamura.

Specifically, claim 1 (and claims 3 and 7-10 depending from claim 1) recites:

A head-mounted image display apparatus comprising:
an image display element;
a projection optical system that projects an image displayed by
said image display element;
**a screen on which the image projected by said projection optical
system is formed;** and
a combiner disposed between said projection optical system and
said screen,
wherein said combiner transmits image light from said projection
optical system and directs it to said screen, and reflects the image light
reflected at the screen while simultaneously transmitting external light.

(Emphasis added). Thus, according to claim 1 an image is projected by a projection optical system onto a screen such that said image is actually formed on the screen. The present Office Action alleges that Okamura discloses this aspect of claim 1 by disclosing a diffusion plate (item 6, Fig. 4) as a projection optical system, a reflecting ocular lens (item 7, Fig. 4) as a screen, and that an image is formed on the lens in order to facilitate the reflection of an image. However, this allegation is respectfully traversed. The diffusion

plate 6 of Okamura is not a "projecting" element since the diffusion plate 6 does not do anything to focus the transmitted light into a real image. In fact, it is clearly shown in Fig. 1 that light exiting from the diffusion plate 6 is divergent, and therefore not directed towards any particular focal plane where an image could be formed. Thus, it follows that the diffusion plate 6 does not project an image and form that image on the ocular lens 7, so Okamura fails to disclose or suggest a projection optical system and screen as recited in claim 1. Therefore, since Okamura fails to disclose all of the limitations of claim 1, Okamura cannot anticipate claim 1, or claims 3 and 7-10 depending from claim 1.

With respect to claim 11, this claim recites:

A head-mounted image display apparatus comprising:
an image display element;
a projection optical system that projects an image displayed by
said image display element;
**a screen on which the image projected by said projection optical
system is formed;** and
a combiner that reflects image light reflected at said screen, and
simultaneously transmits external light.

(Emphasis added). Thus, like claim 1, claim 11 recites that an image is projected by a projection optical system onto a screen such that said image is actually formed on the screen. Therefore, it is respectfully asserted that claim 11 patentably distinguishes over the Okamura for at least the same reasons discussed above in connection with claim 1.

Accordingly, it is respectfully requested that the rejection of claims 1, 3, and 7-11 under 35 U.S.C. § 102(b) over Okamura be reconsidered and withdrawn.

35 U.S.C. § 103(a) Rejections

Claims 4-6 are rejected under 35 U.S.C. § 103(a) over Okamura in view of U.S. Patent No. 6,185,045 B1 to Hanano ("Hanano").

Claims 4-6 depend from independent claim 1. As discussed above, Okamura does not disclose or suggest a screen on which an image projected by the projection optical system is formed.

Additionally, with respect to claims 4-6 which depend from independent claim 1, Okamura is silent as to an eyepiece optical system disposed between the combiner and the user, wherein the eyepiece optical system enlarges the image projected onto the screen as is recited by claim 4. Okamura is also silent as to an optical element disposed on an external side of the combiner with respect to the eyepiece optical system as is recited by claim 5. Further, Okamura is silent as to the system having a composite optical power of substantially zero as is recited by claim 6.

In order to overcome the obvious inadequacies of Okamura, the Examiner has combined Okamura with Hanano. Hanano is cited specifically for the purpose of teaching an eyepiece in conjunction with the optical element to produce an optical power of zero, as well as said image display apparatus being positioned substantially at said second end.

However, with respect to claim 1, Hanano fails to overcome the above described inadequacies of Okamura. Hanano teaches an image display apparatus having a projection optical system for projecting an image and an image display device which displays the image. The projection optical system of Hanano has a periphery bending optical device that distributes a part of light beams from the periphery of the image display device to the inside and outside of an image display area. That is, the projection optical system of Hanano has an edge portion having a refracting or reflecting action arranged such that the refracting power for the periphery of the image display area is larger in the positive direction than the refracting power for the principal display area. The ocular optical system is preferably an optical system including a surface which has both transmitting and reflecting actions and which is tilted with respect to both the image display device and the visual axis so as to project an enlarged image of the image displayed by the image display device. *See Hanano, col. 3, lines 27-59.*

The apparatus of Hanano utilizes a series of mirrors which enlarge and project a virtual image while altering the direction of the image on the periphery of the display area before directing the image to an eye of an observer. That is, a real image is not projected to a screen by a projection optical system nor is a real image formed thereon. Further, Hanano fails to disclose or suggest that the combiner transmits image light from the projection optical system and directs it to said screen, and reflects the image light reflected at the screen while simultaneously transmitting external light.

To provide a *prima facie* case for obviousness, the combined references must show or suggest every limitation of the claim. MPEP §2143.03. Neither Okamura nor Hanano disclose or suggest a projection optical system and screen as recited in claim 1. Thus, it follows that the proposed combination of Okamura and Hanano fails to disclose a projection optical system and screen as recited in claim 1 as well. Therefore, since the proposed combination of Okamura and Hanano fails to disclose or suggest all of the limitation of claim 1, the proposed combination of Okamura and Hanano cannot render obvious claim 1, or claims 4-6 which depend from claim 1.

Accordingly, it is respectfully requested that the rejection of claims 4-6 under 35 U.S.C. § 103(a) over Okamura in view of Hanano be reconsidered and withdrawn.

Claim 13 is rejected under 35 U.S.C. § 103(a) over Okamura in view of Hanano, further in view of U.S. Patent No. 6,150,998 to Travers et al. ("Travers") and U.S. Patent No. 5,537,092 to Suzuki et al. ("Suzuki").

Claim 13 recites a head-piece adapted to be worn on a head of a wearer, the head of the wearer having a face, the head-piece comprising:

a hood, said hood adapted to be positioned on the head of the wearer;

a visor having a first end and a second end, said first end of said visor rotatably mounted to said hood such that said visor rotates from a first position, substantially covering the face of the wearer, to a second position

not substantially covering the face of the wearer;
an image display apparatus comprising:
an image display element;
a projection optical system that projects an image displayed
by said image display element;
**a screen on which the image projected by said projection
optical system is formed;**
a combiner that reflects image light reflected at said screen,
and transmits external light;
an eyepiece optical system disposed between said combiner
and the wearer,
wherein said eyepiece optical system enlarges the
image projected onto said screen; and
an optical element disposed on an external side of said
combiner with respect to said eyepiece optical system,
wherein a composite optical power of said eyepiece
optical system and said optical element is substantially zero, and
wherein said image display apparatus is positioned substantially at
said second end of said visor.

(Emphasis added). Thus, like claim 1, claim 13 recites that an image is projected by a projection optical system onto a screen such that said image is actually formed on the screen. As pointed out above, both Okamura and Hanano, singly and combined, fail to disclose or suggest this aspect of the claims.

With respect to Travers, this reference likewise fails to disclose or suggest a projection optical system and screen as recited in claim 13.

Travers discloses a headset for noncircumferential engagement of the head which provides a suspended visual display while shielding a wearer's eyes from ambient light. The device of Travers is adapted to have no weight or bearing contact between the nose and the cheeks and the visual display or the headset such that the headset accommodates various head sizes by the cooperation of the brow piece and the nape strap in connection with the compensators of the arms. (See Travers, col. 2, lines 9-17 and col. 4, lines 27-51). Among other things, Travers does not disclose or suggest using a projection optical system to form an image on a screen. In actuality, Travers does not teach any particular

method of forming an image. Thus, Travers cannot overcome the inadequacies of the above cited combination of references.

With respect to Suzuki, this reference likewise fails to disclose or suggest a projection optical system and screen as recited in claim 13. Instead, the device of Suzuki projects a virtual image (Xo) and does not form a real image on a screen.

Thus, none of Okamura, Hanano, Travers, and Suzuki, discloses or suggests a projection optical system and screen as recited in claim 13. It follows that the proposed combination of Okamura, Hanano, Travers, and Suzuki also fails to disclose a projection optical system and screen as recited in claim 13 as well. Therefore, since the proposed combination of Okamura, Hanano, Travers, and Suzuki fails to disclose or suggest all of the limitation of claim 13, the proposed combination of Okamura and Hanano cannot render obvious claim 13.

Accordingly, it is respectfully requested that the rejection of claim 13 under 35 U.S.C. § 103(a) over Okamura in view of Hanano, further in view of Travers and Suzuki, be reconsidered and withdrawn.

CONCLUSION

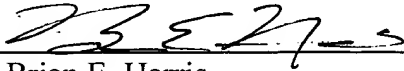
In view of the foregoing remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Application No.: 09/615,233
Response dated January 4, 2004
Reply to Office Action of November 4, 2003

Any fee required for such Petition for Extension of Time, and any other fee required by this document, other than the issue fee, and not submitted herewith, should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

By: 
Brian E. Harris
Reg. No. 48,383
Agent for Applicants

BEH/rb:jkk
SIDLEY AUSTIN BROWN & WOOD LLP
717 N. Harwood, Suite 3400
Dallas, Texas 75201
Direct: (214) 981-3461
Main: (214) 981-3300
Facsimile: (214) 981-3400
February 4, 2004